NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

IRRIGATION WATER CONVEYANCE

RIGID GATED PIPELINE

(ft)
CODE 430HH

DEFINITION

A rigid pipeline, with closely spaced gated, installed as part of a surface irrigation system.

PURPOSE

To efficiently convey and distribute eater to the land surface for better water management, without causing excessive erosion, water losses, or reduction in water quality.

CONDITIONS WHERE PRACTICE APPLIES

The rigid gated pipeline shall be planned and located to serve as an integral part of an irrigation distribution system that has been designed to help conserve soil and water resources on a farm. This practice shall not be used in lieu of buried pipelines for conveyance systems; however, reaches of ungated pipe may be used to obtain necessary working pressure for the system or to convey the water to various points.

Water supplies and rated of irrigation delivery for the area shall be sufficient to make irrigation practical for the crop to be grown and for border, furrow, corrugation, or contour water application methods.

CRITERIA.

Working pressure. The maximum working pressure shall be 10 psi or 23 ft of head. Design working heads in excess of 23 feet shall be controlled by installing orifice plate head reducers, butterfly valves, stand pipes, or other appurtenances for head control.

Friction losses. For design purposes, friction head losses shall be no less than those computed by the Hazen-Williams equation, using a roughness coefficient of C=130 for aluminum pipe and C=150 for plastic pipe, A multiple outlet factor shall be used in computing losses only when it affects the design pipe size.

Flow velocity. The design velocity in the pipeline when operating at system capacity shall not exceed 7 ft/s.

Capacity. The design capacity of the pipelines shall be sufficient to deliver an adequate irrigation stream to the design area for the planned irrigation method.

Outlet gates. Individual outlet gates shall have the capacity at design working pressure to deliver the required flow to a point at least 0.3 ft above the field surface.

Head requirement. The working head shall not be less than 0.5 ft above the outlet gates, unless a detailed design is complete to indicate that a lower head requirement is adequate. Where streamflows are erosive, a “sock” shall be installed on each gate or some other means of erosion control shall be provided.

Flushing. A surface outlet shall be installed at the terminal end of the pipeline if needed for flushing the line free of sediment or other foreign material.

Quality of water. Water quality shall be evaluated for all aluminum pipeline installations. A copper content in excess of 0.02 ppm produced nodular pitting and rapid deterioration of pipe if water is allowed to become stagnant. The pipeline should be drained after use. Provisions shall be made to prevent trash inflow into the gated pipeline.

Materials. Pipe materials shall equal or exceed the physical requirements specified under “Materials.”

NRCS, WY
January, 2000

Related Structures

On farm irrigation deliver systems shall meet or have a plan for improving the system to meet the appropriate irrigation water conveyance standard.

Appurtenances used to join the gated pipeline to the delivery system outlet must have adequate capacity at design working head to deliver the required flow.

CONSIDERATIONS

Water Quantity

1. Effect on the components of the water budget, especially on volumes and rated of infiltration, evaporation, transpiration, deep percolation and ground water recharge.
2. Effects on downstream flow or aquifers that would affect other water uses or users.
3. Potential use for irrigation water management.

Water Quality

1. Effects on erosion along furrows and the movement of sediment and soluble and sediment-attached substances carried from the field.
2. Effects on the movement of dissolved substances into the soil, and on percolation below the root zone or to ground water recharge.
3. Potential effect of water level control on soil nutrient processes such as plant nitrogen use or denitrification.
4. Effects on the salinity of soils, soil water, or downstream flows.
5. Effects of controlled water delivery on the water temperatures that could cause undesirable effects on aquatic and wildlife communities.
6. Effects on the visual quality of water resources.

Plans and specifications for installing gated pipelines shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purposes.

PLANS AND SPECIFICATIONS

Plans and specifications for installing gated pipelines shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purposes.

OPERATIONS AND MAINTENANCE

Provisions shall be made to periodically inspect the pipe for excessive water loss.